

A new species of the genus *Proleucoptera* Busck (Lepidoptera, Lyonetiidae) from the Nasu Imperial Villa, Japan

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Abstract A Lyonetiid leaf miner *Proleucoptera parnasiella* Ahn and Hirowatari sp. nov. is described from Japan. The larvae feed into a leaf of *Parnassia palustris* (Parnassiaceae) and make a blotch mine. The new species superficially resembles and is most closely related to *P. oxyphyllella* Kuroko from Japan, but it can be distinguished from the latter by the larger valva in the male genitalia lacking the small weakly sclerotized projection.

Key words leafminer, Parnassiaceae, *Parnassia palustris*, *Proleucoptera parnasiella* sp. nov., Taxonomy.

Introduction

During 2003–2007, we carried out surveys of smaller moths in the Nasu Imperial Villa, Tochigi Prefecture, Japan. They were conducted as supplementary projects of faunistic surveys in this area during 1997 and 2001 (Higuchi, 2009). In 2005, one of us (Murase) found an unknown leaf miner species belonging to the subfamily Cemiostominae (=Leucopterinae) of the family Lyonetiidae making a blotch mine on a leaf of *Parnassia palustris* L. (Parnassiaceae). After rearing the larvae in several mines, some adults emerged. In Ahn *et al.* (2009), this species was reported as an undetermined species belonging to the genus *Proleucoptera* Busk, 1902. Detailed examination of the morphological characters such as wing veins and genitalia revealed that it is a new species of the genus *Proleucoptera*. In this paper, we describe it with biology of immature stages.

Terminology mainly follows Kuroko (1964) including the wing markings and the genitalia.

Description

***Proleucoptera parnasiella* Ahn and Hirowatari sp. nov.** (Figs 1–4)

Proleucoptera sp.: Ahn *et al.*, 2009: 59, pl.2 fig.16; Ahn and Hirowatari, 2013: 187, pl.3-22-28.

Adult (Fig. 1). Wingspan 7–8 mm. Head smooth,

shining white. Antenna almost equal to forewing in length, grayish fuscous; base and apex white; eyecap moderately broad, shining white. Labial and maxillary palpi absent. Proboscis naked. Patagium shining white. Meso- and metathoraxes naked, pale yellow. Hind legs creamy white; tibia with long white hairs, basal part shining white; 1st, 2nd and sometimes 4th tarsomeres with dark fuscous bands terminally.

Forewing broad lanceolate, shining white, apical 1/4 of wing pale yellow; two costal streaks pale yellow, margined with dark fuscous scales; three strigulae on costa, dark fuscous; apical transverse line darker than costal strigula. Costal cilia white except apical part, which is grayish fuscous; apical and terminal cilia pale yellow. Leaden-metallic tornal patch ovate, margined with black scales. Hindwing narrow lanceolate, shining white. Cilia white.

Wing venation (Fig. 2). In forewing, R1 from near base, R2 and R3 stalked, whole venation similar in appearance to that of *Proleucoptera celastrella* (fig. 30 of Kuroko, 1964), but more reduced in hindwing.

Abdomen grayish fuscous above, shining white below.

Male genitalia (Fig. 3A, B). Eighth sternite sclerotized. Process of eighth sternite sclerotized, large and triangular, distal part slightly curved inwardly, ventral margin thickened. Process of gnathos represented by a pair of tapered hairy lobes. Valva relatively large, lacking

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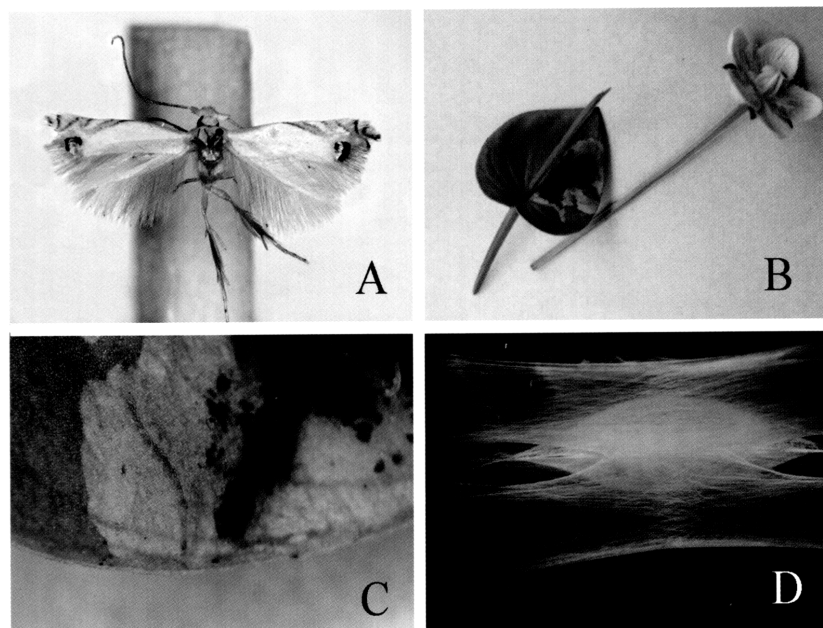


Fig.1. Adult, mine, larva and cocoon of *Proleucoptera parnasiella* sp. nov.
A. Holotype ♂. B. Mine on the hostplant, *Parnassia palustris* (Parnassiaceae).
C. Larva in a mine. D. Cocoon.

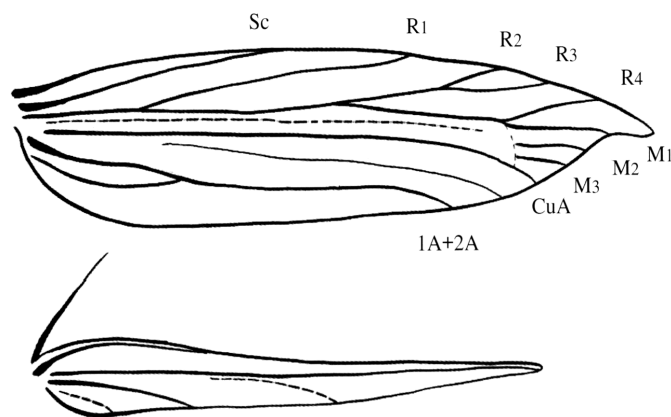


Fig.2. Wing venation of *Proleucoptera parnasiella* sp. nov. ♂

the small weakly sclerotized projection present in *P. oxyphylla* (Fig. 4A). Aedeagus short and strongly sclerotized, egg-shaped, with well spined cornuti, distal part cup-shaped, apex dark, bifurcate, each side slightly curved outwards.

Female genitalia (Fig. 3C). Papilla analis bluntly pointed, moderately sclerotized and setose. Apophysis posterioris broad and short, strongly sclerotized, weakly sinuate. Apophysis anterioris very short, half length of apophysis posterioris. Ostium bursae weakly sclerotized. Ductus bursae very weak and simple. Corpus bursae small,

membranous, without signum.

Material examined. Holotype ♂, "Japan, [Honshu], Tochigi-ken, Nasu Imperial Villa, Oumeitei, 23. IX. 2005, M. Murase [larva] leg.", "10. X. 2005 [made cocoon], 21. X. 2005 [emerged], M. Murase]", "Host [*Parnassia palustris*] [leaf & stem miner]", "[gen. slide no.] OPU-AHN111". Holotype deposited in National Museum of Nature and Science (NMNS), Tokyo (Tsukuba).

Paratypes. Same data as holotype: 1 ♂, 12. X. 2005 [made cocoon], 25. X. 2005 [emerged], OPU-AHN110; 2 ♂,

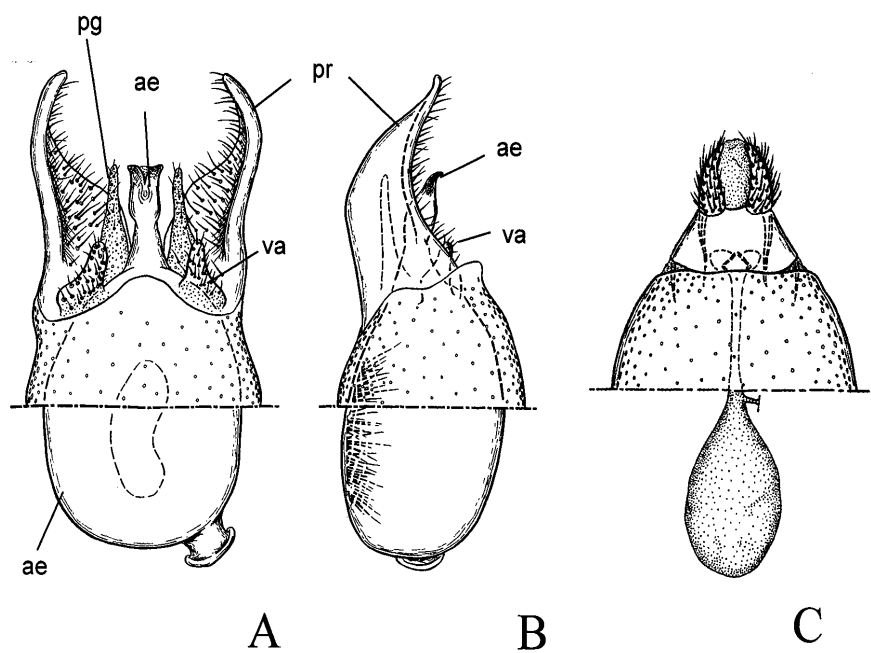


Fig.3. Male and female genitalia of *Proleucoptera parnasiella* sp. nov.

A. Male genitalia (holotype), ventral view.

B. Ditto, lateral view. C. Female genitalia (paratype), ventral view.

ae: aedeagus, pg: process of gnathos, pr: process of 8th sternite, va: valva.

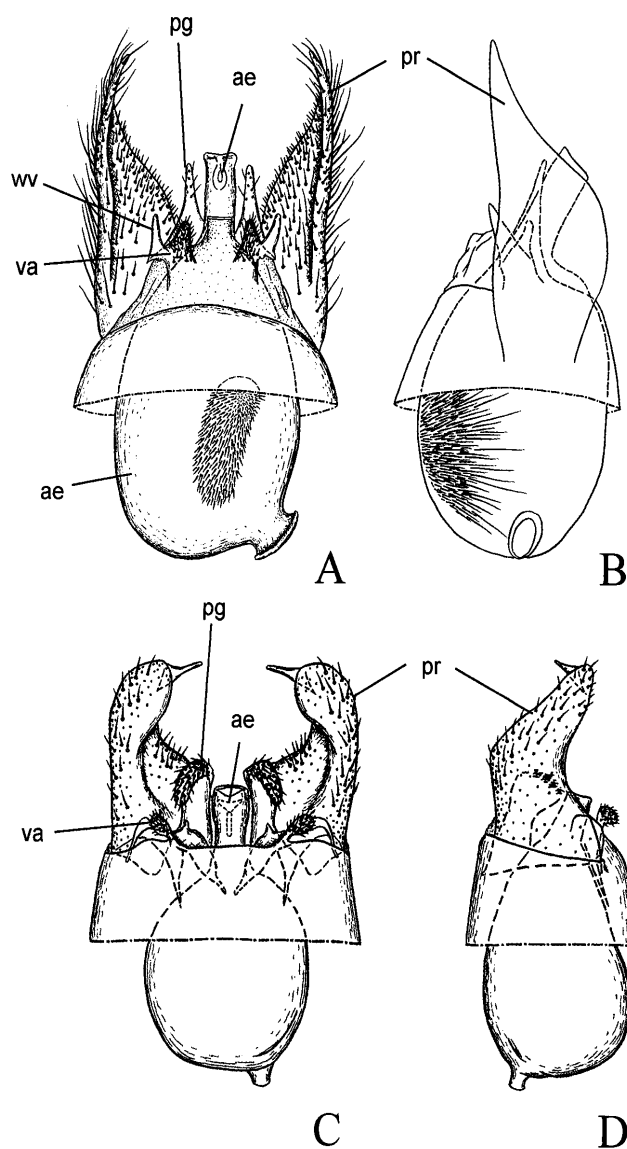


Fig. 4. Male genitalia of *Proleucoptera* spp.

A. *P. oxyphyllalla* Kuroko, 1964, ventral view. B. Ditto, lateral view.

C. *P. celastrella* Kuroko, 1964, ventral view. D. Ditto, lateral view.

ae: aedeagus, pg: process of gnathos, pr: process of 8th sternite, va: valva, ww: weak projection of valva.

25. X. 2005 [emerged]; 1 ♀, 10. X. 2005 [made cocoon], 21. X. 2005 [emerged], OPU-AHN112; 2 ♀, 7. XI. 2005 [emerged]; 2 ♂ 1 ♀, same locality as holotype, 29-31. X. 2007 [emerged], Y. Arita leg.; 2 ♂ 1 ♀, 3. XI. 2007 [emerged]; 1 ♂, Oomaruhopposhamen 1400m, 6. VI. 2005. Y. Arita leg. Paratypes in NMNS and OPU.

Distribution. Japan, Honshu (Tochigi Prefecture).

Etymology. The specific name “*parnasiella*” refers to the generic name of the host plants, *Parnassia palustris*.

Host plants. *Parnassia palustris* L. (Parnassiaceae).

Biology. The habit of mining and shape of cocoon resemble those of *P. celastrella* and *P. oxyphyllella* in making a blotch mine and a spindle-shaped cocoon covered by an H-shaped silken roof. In 2005 at Oumeitei, Nasu Imperial Villa, Tochigi Prefecture, some mines of *P. parnasiella* (Fig.1B) were found during September 23-36, 2005. Two or three larvae were found in a mine and the frasses were gathered near the central area (Fig.1C). Two and three larvae made cocoons (Fig.1D) on October 10 and 12, respectively and the adults emerged on October 21 and 25, respectively. Although one adult was collected on June 6, no trace of mines were found on the host plant at that time or even in July. In 2007, some adults emerged in autumn on October 29-31 and November 3. Thus, this species seems to have one or two generations a year and overwintering stage is uncertain.

Remarks. Three species have been known in the genus *Proleucoptera* Busk in Japan, *P. smilactis* Kuroko, 1964, *P. celastrella* Kuroko, 1964 and *P. oxyphyllella* Kuroko, 1964. The new species was reported by us (Ahn *et al.* 2009) as *Proleucoptera* sp., which was considered to be related to *P. celastrella* at that time. As a result of present study, the new species is inferred to be more closely related to *P. oxyphyllella* rather than to *P. celastrella* based on detailed comparison of the male genitalia (Figs 3, 4). The new species superficially resembles *P. oxyphyllella*, but it can be distinguished from the latter by the larger valva lacking the small weakly sclerotized projection. In the original description of *P. oxyphyllella*, Kuroko (1964) examined only two males. Comparing the drawing of the female genitalia of *P. celastrella* by Kuroko (1964: pl.13 fig.70) with those of *P. parnasiella*, we were unable to recognize any clear difference between them. In addition, as we could not examine any female specimen of *P. oxyphyllella*, we did not directly compare the female genitalia of *P. celastrella* and *P. oxyphyllella* in the present study.

The host plant of this new species is *Parnassia palustris* L., which was traditionally placed in the family Saxifragaceae. But, according to recent phylogenetic

studies of vascular plants, the host plant is now included in its own newly established family Parnassiaceae of Celastrales (The Angiosperm Phylogeny Group, 2009). This suggests that the new species, *P. parnasiella*, is derived from a common ancestor of *P. celastrella* and *P. oxyphyllella*, which feeds on the host plant in the Celastrales.

We also found that *P. parnasiella* utilizes another plant, *Parnassia foliosa* var. *nummularia* as a host by our observation of some mines on the leaf, but could not confirm that any adults emerged from it.

Further investigations of the phylogeny of the genus and biology of the new species are required.

Acknowledgments

We wish to thank His Majesty the Emperor of Japan and the Imperial Household Agency for giving permission for the investigations in the Nasu Imperial Villa, Tochigi Prefecture, Japan. Our cordial thanks are also due to Dr H. Higuchi of Tochigi Prefectural Museum and members of the Investigating committee of Flora and Fauna of the Nasu Imperial Villa for supporting the surveys. Dr H. Kuroko of Kishiwada, Osaka provided us with valuable advice and literature. Dr B.W. Lee of Korea National Arboretum and Dr K. Yamada of Tokushima Prefectural Museum helped us to collect materials. The first author (Ahn) wishes to express his thanks to Prof M. Ishii and Dr N. Hirai of Osaka Prefecture University, Sakai, for their valuable suggestions and encouragement when he studied in OPU as a graduate student.

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摘 要

那須御用邸で発見された*Proleucoptera*属の一新種（鱗翅目，ハモグリガ科）（安 能浩・村瀬ますみ・有田 豊・広渡俊哉）

2003年から2007年に，著者らは栃木県那須御用邸で小蛾類の調査を行い，その過程で2005年にウメバチソウ（*Parnassia palustris* L.）に斑状潜孔をつくるハモグリガ科の未知種を発見した．幼虫を飼育し成虫を羽化させてその形態を詳細に調査した結果，シロハモグリガ亜科の*Proleucoptera*属に含まれる新種であることが明らかになったので記載した．

Proleucoptera parnassiella Ahn and Hirowatari sp. nov. ウメバチソウシロハモグリ（新種）

寄主植物：ウメバチソウ（ウメバチソウ科）．

分布：栃木県（那須御用邸）．

本種は著者ら（Ahn *et al.*, 2009）によって和名ウメバチソウシロハモグリが与えられ，ツルウメモドキシロハモグリ *P. celastrella* に近縁な未記載種であることが示唆されていた．今回，さらに近縁種を含めて交尾器の形状等の形質を

詳細に調査・比較した結果，本種はツリバナシロハモグリ *P. oxyphyllalla* Kuroko にもっとも近縁で，斑紋による識別は難しいが，♂交尾器では，valvaはより大きく，硬化の弱い基部外方の小突起を欠くという点で区別できることが分かった．

寄主植物であるウメバチソウは旧来ユキノシタ科に分類されており，ウメバチソウシロハモグリがニシキギ科の植物を寄主とするツルウメモドキシロハモグリなどに近縁であることは寄主植物との関係を考察する上で重要であることを著者らは指摘していた（Ahn *et al.*, 2009）．最近明らかになった植物の分子系統解析にもとづく分類体系では，ウメバチソウはニシキギ目のニシキギ科に近縁な独自の科（ウメバチソウ科）として扱われており，本種はニシキギ科のツリバナやツルウメモドキなどを寄主とする種と共通の祖先から分化したことが推定された．また，羽化までは至ってないが，本種は同じニシキギ科に属するシラヒゲソウ（*Parnassia foliosa* var. *nummularia*）の葉にも幼虫が潜ることが示唆された．

(Received October 29, 2014. Accepted November 20, 2014)